

CHM 103 EXAM I

Show all calculations with correct units and significant figures. Write in complete sentences. Remember the take-home is due on Friday, 1 April in class. **Good Luck!!!**

1. A chemist goes into the laboratory to check the functioning of four analytical balances. Balance 1, 2, and 4 were checked with a 5.0000-g standard mass and balance 3 with a 10.0000-g standard mass. Complete the table. (25)

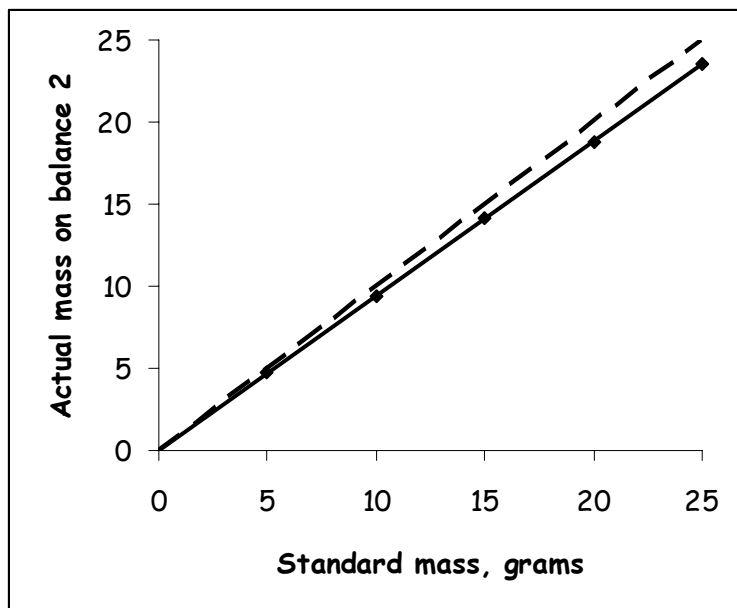
	balance 1	balance 2	balance 3	balance 4
trial 1	5.9678	5.6673	10.0122	6.1100
trial 2	5.9643	5.6734	10.0111	5.9888
trial 3	5.9664	5.6323	10.0011	5.9899
trial 4	5.9672	5.6543	10.0214	6.0553
mean				
σ				
%CV				
%error				

Which balance is the most accurate? Why?

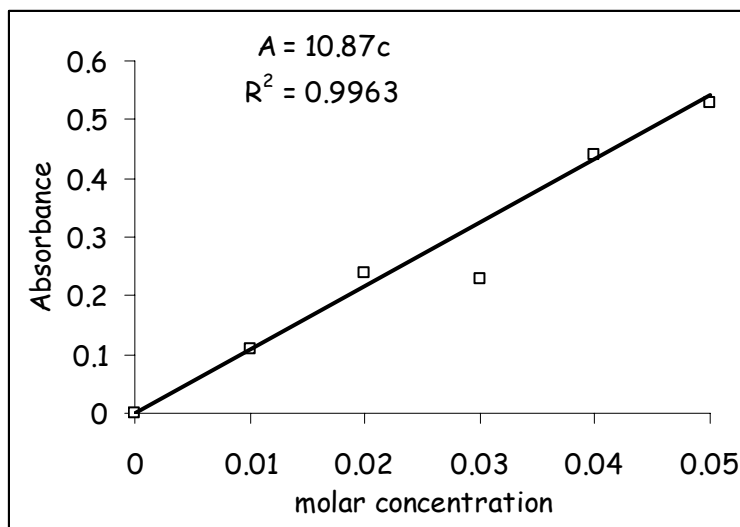
Which balance is most precise? Why?

The chemist then checked a variety of standard masses on balance 2. The results are shown on the graph below as the solid line. The dashed line is $y = x$. Explain the error.

(10)



2. Consider the calibration curve given below, which was determined in a 1.2-cm cell at λ_{\max} of 450 nm. (35)



There is an error in the 0.03 M standard. Is the error a determinant or indeterminate error? Explain.

The line is a regression line not using the 0.03 M standard. What does the r^2 value mean?

If the 0.03 M standard was included in the regression, what would happen to the r^2 value?

Show how the calibration curve would change if the following conditions occurred Draw a line on the graph above to indicate each.

- ◆ the wavelength was changed to 500 nm.
- ◆ the cell size was 1.5 cm

Calculate the numerical value of the molar absorptivity.